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Office of Criminal Enforcement, Forensics and Training

National Enforcement Investigations Center

NEIC

NEICVP1186E01

RESOURCE CONSERVATION AND RECOVERY ACT COMPLIANCE INVESTIGATION REPORT

Dow Chemical
901 Loveridge Road
Pittsburg, California
NEIC Project No.: VP1186

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INTRODUCTION

At the request of U.S. Environmental Protection Agency (EPA) Region 9, the EPA National Enforcement Investigations Center (NEIC) conducted a Resource Conservation and Recovery Act (RCRA) compliance investigation of the Dow Chemical (Dow) facility located at 901 Loveridge Road in Pittsburg, California.

This report presents NEIC's field observations during the April 4 through 8, 2016 on-site inspection of Dow, and the results of California's Department of Toxic Substances Control (DTSC) laboratory analyses of samples collected during the on-site inspection. The information presented in this report was collected from background documentation, personnel interviews, direct observations, company-provided documentation, and state and federal government databases. With the participation of EPA Region 9 and California's DTSC, NEIC conducted the RCRA inspection of the Dow facility with the following objectives:

- Conduct a RCRA on-site inspection of Dow, specifically focusing on the facility's two halogen acid furnaces (HAFs).
- Assist in development of a strategy for DTSC's collection of samples of potential hazardous wastes.
- Evaluate all information obtained during the investigation to determine compliance with applicable RCRA regulations and permits.

FACILITY BACKGROUND

Dow operates a RCRA treatment, storage, and disposal (TSD) facility and is a large quantity generator of hazardous waste, EPA ID No. CAD076528678. Operations include research and development and the manufacture of products for agricultural operations, pest control services, paper manufacturers, carpet mills, and biocides. During the manufacture of chemical products at the facility, specific liquid and gaseous (vent emissions) by-products are produced that are thermally oxidized in the two HAFs. Aqueous hydrochloric acid (HCl) is produced as a result of thermally oxidizing the chlorinated liquids and gas streams in the HAFs. The HCl is sold as a product to industrial customers and is used for pH control at the brine/condensate plant within the facility. The HAFs have been in operation for more than 20 years. At the time of the inspection, Dow was operating under a DTSC-issued hazardous waste facility permit, for the storage of hazardous waste, expiring in July 2016. Dow was also operating under a DTSC-issued boiler and industrial furnace (BIF) permit that expired in April 2013, for which it had submitted an application for renewal in 2012. The HAFs are industrial furnaces and are included in Dow's BIF permit.

INVESTIGATION METHODS

NEIC performed the following activities to accomplish the investigation objectives:

- Met with facility personnel to discuss process operations, including review of hazardous waste feeds, monitoring, and automatic waste feed cutoff (AWFCO) systems and residue treatment systems associated with the HAFs.

- Conducted walk-through tours of the facility to observe process operations.

- Reviewed and copied (as appropriate) facility documents, including operating plans, procedures, and records. Specifically, NEIC reviewed Dow's continuous emissions monitoring (CEMS) and AWFCO records associated with the HAFs and records associated with excluded recyclable material (ERM) wastes (California exclusion).

- Assisted DTSC and EPA Region 9 in developing a strategy for DTSC's collection of samples of potential hazardous wastes.

All activities of NEIC personnel were performed in accordance with the NEIC quality system.

ON-SITE INSPECTION SUMMARY

NEIC conducted the on-site inspection of Dow from April 4 through 8, 2016. The inspection team included Lorna Goodnight (project manager), Jacquelyn Vega, and Tara Hubner from NEIC. Rick Sakow and Richard Francis from EPA Region 9 and Michael Pixton and multiple other inspectors from DTSC also attended the inspection. During the opening meeting on April 4, 2016, credentials were presented to Robert Rhode, Dow environmental health and safety delivery leader.

NEIC conducted a process review of Dow's operations. During this review, NEIC examined the major operational aspects of the Dow facility, including process operations, management of hazardous wastes in the HAFs, ERM waste management, hard copy and digital data management, and on-site wastewater treatment processes. NEIC's process review was based on discussions with facility personnel, records reviews (hard copy and digital), and a walk-through tour of the operational areas.

Following the process review, NEIC conducted focused inspections of various process units and operations and assisted DTSC and EPA Region 9 personnel in planning for sample collection. At the conclusion of the on-site inspection on April 8, 2016, NEIC held an exit conference with Dow personnel to discuss preliminary inspection observations. During the exit conference, NEIC advised Dow that final compliance determinations would be made by EPA Region 9.

Before leaving the site, the inspection team provided Dow a complete list of all documents received on-site by NEIC, and logs and copies of all photographs taken by NEIC.

PROCESS OVERVIEW

The Dow Pittsburg facility originally was operated for chemical manufacturing between 1916 and 1938 by the Great Western Electro Chemical Company, which produced chlorinated hydrocarbons and mining chemicals. Dow acquired ownership of the property in 1938. The facility currently employees approximately 300 employees and 200 contractors. The facility operates 24 hours a day, 7 days a week.

The facility produces personal care products and agricultural and intermediate products, including the following:

- Personal care products
  - DOWICIL® – antimicrobial, industrial, paints, and personal care products
- Agricultural and intermediate products

  - N-SERVE® – Nitrapyrin formulation – nitrogen stabilizer; increases fertilizer effectiveness
  - INSTINCT® – Nitrapyrin formulation – nitrogen stabilizer; increases fertilizer effectiveness
  - LONTREL® – Clopyralid – broad-leaf herbicide

- Intermediate agricultural products
  - Symtet – 2,3,5,6-tetrachloropyridine (TCP) (symmetrical tetrachloropyridine)
  - Pentachloropyridine (PCP)
  - 2-chloro-5-trichloromethylpyridine (β-2-Tet)
  - 2,3-dichloro-5-trichloromethylpyridine (β-2,3-Penta)
  - Methyl ester
  - Trifluoro – fluorinated picoline
  - AFTF – fluorinated picoline

- Co-products
  - Caustic
  - Potassium chloride (KCl) solution
  - Carbon tetrachloride (CCl_4)
  - Hydrochloric acid solution
  - Boiler feed water

Dow currently has two tenants, K2 and Douglas, on-site that produce the following products:

- K2 – leased by K2 but operated by Dow
  - Bleach
  - Chlorine – supplies chlorine for Dow operations

- Douglas
  - VIKANE® – sulfuryl fluoride – fumigant; combats termite infestations
  - PROFUME® – sulfuryl fluoride – fumigant; used in food processing (flour and grain mills)

DOWICIL® Plant

The DOWICIL® plant is located in block 660 of the facility. Different grades of DOWICIL® products are produced by reaction of [redacted] **CBI - Ex. 4** [redacted] There are no byproducts from this reaction. Process vent streams are treated by the Symtet halogen acid furnace (ST HAF). Waste heavies (referred to as tars) from the process are sent for off-site disposal at Clean Harbors in Aragonite, Utah. Slab water from washdown, cleaning, and rainfall on the process area is managed in the Dow wastewater treatment system (DWWTS).

Chlorpyridines Plant

The chlorpyridines plant is located in block 660 of the facility. The basic process chemistry of the plant is the [redacted] CBI - Ex. 4 [redacted] are used in some of the product formulations. This plant produces the following intermediate agricultural products: nitrapyrin, clopyralid, β-2-tet, Symtet, and PCP. Nitrapyrin and clopyralid are further processed within the facility to produce N-SERVE®, INSTINCT®, and LONTREL®.

Nitrapyrin and Clopyralid Production

Nitrapyrin (2-chloro-6-trichloromethylpyridine) and clopyralid (3,6-dichloro-2-trichloromethylpyridine) are produced by the [redacted] CBI - Ex. 4 [redacted] Following the reaction, the catalyst is removed from the product stream by strippers. The products are then removed from the stream by distillation. Chlorine is recovered from the reactors to be recycled through the reactors and also absorbed into water to produce the hydrogen chloride co-product. Process vent streams, waste heavies (tars), and spent ferric chloride catalyst are thermally destroyed in the ST HAF. Spent caustic sodium hydroxide (NaOH) scrubber effluent and slab water from washdown, cleaning, and rainfall on the process area are managed in the DWWTS.

β-2-Tet, Symtet, and PCP Production

β-2-tet (2-chloro-5-trichloromethylpyridine), Symtet (2,3,5,6-tetrachloropyridine), and PCP (pentachloropyridine) are produced by the chlorination of β-picoline in the presence of a catalyst, ferric chloride. Following the reaction, the catalyst is removed from the product stream by strippers. The products, β-2-tet, Symtet, and PCP, are then removed from the stream by distillation. HCl and carbon tetrachloride are byproducts of the process. Process vent streams, waste heavies (tars), and spent ferric chloride catalyst are thermally destroyed in the ST HAF. Spent caustic (NaOH) scrubber effluent and slab water from washdown, cleaning, and rainfall on the process area are managed in the DWWTS.

β-2,3-Penta Plant

β-2,3-penta (2,3-dichloro-5-trichloromethylpyridine) is produced in block 560 of the facility by the [redacted] CBI - Ex. 4 [redacted]. Chlorpyridine by-products from the reaction are sent to the 660 block. The process vent streams from this plant are sent to the 660 block. Spent caustic (NaOH) scrubber effluent and slab water from washdown, cleaning, and rainfall on the process area are managed in the DWWTS.

ME Plant

Methyl ester (ME) is produced in block 640 of the facility by the reaction of [redacted] **CBI - Ex. 4** [redacted] The reaction produces KCl as a co-product. Off-specification ME is made into a slurry using n-methyl pyrrolidone (NMP) solvent and reintroduced into the manufacturing process. The process vent streams from this plant are sent to the manufacturing services halogen acid furnace (MS HAF). Waste heavies (tars) are sent to Veolia in Azusa, California, which recovers the NMP solvent and returns the recovered NMP solvent to Dow. Slab water from washdown, cleaning, and rainfall on the process area is reused.

AFTF and Trifluoro Plant

AFTF and trifluoro are produced in block 310 of the facility by the reaction of chlorinated picolines (from block 660) and hydrogen fluoride (HF). Waste heavies (tars) from the process are sent to Clean Harbors in Aragonite, Utah, for thermal destruction. Scrubber effluent and slab water are also sent to Clean Harbors for disposal.

Wastewater Treatment System

The DWWTS includes the chlorinolysis, process storm water treatment, brine, and condensate plants. Some of the effluent is used as boiler feed water off-site. A process flow diagram of the DWWTS is provided in **Figure 1**.

Chlorinolysis Plant

The chlorinolysis plant is located in block 560 of the facility. Chlorinolysis is the first stage of treatment for high organic wastewaters from various parts of the facility, including rainwater, process waters, water from maintenance activities (e.g., hydroblasting and cleaning), and scrubber water. The aqueous feed streams for this plant include the following:

- Tank T-706 is filled with wastewater from tanks T-701, T-703, and T-705; all tanks are located in the specialty chemicals department and labeled ERM. Tank T-706 is hard-piped to tank T-1001. The water in tank T-1001 flows to tank T-1002. The water is pH-adjusted between tanks T-1001 and T-1002 with the addition of either HCl or NaOH. From T-1002, the water continues to chlorinolysis train 1.

- Tanks T-540 through T-549 (10 tanks) are filled by HydroChem; all tanks are labeled ERM. The water from these tanks is then filtered for solids and pumped to tanks T-561 through T-564 (four tanks), all labeled as ERM. From tanks T-561 through T-564, the water continues to T-1001 and then to chlorinolysis train 1.

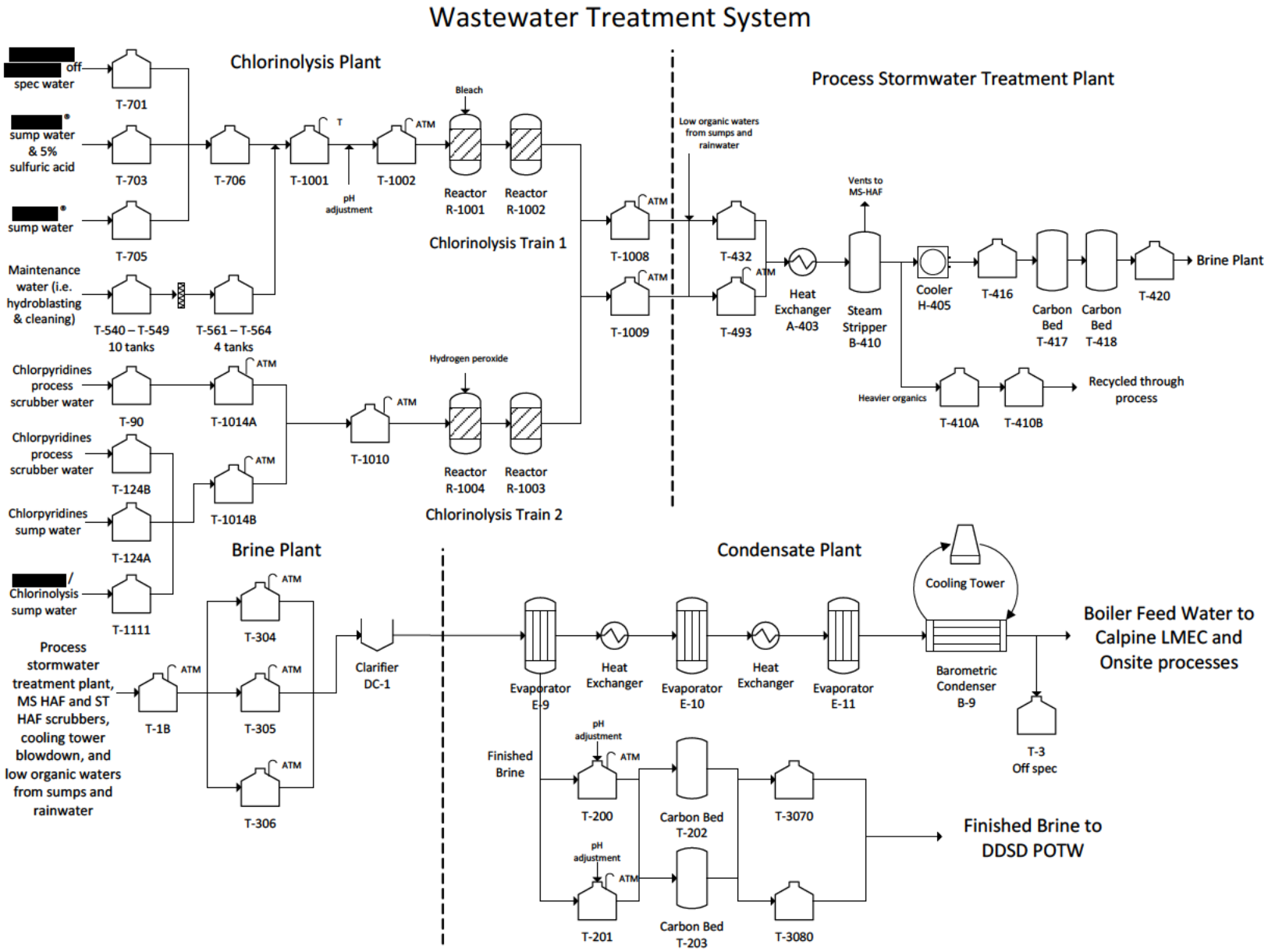

Figure 1. Wastewater treatment system
Dow Chemical
Pittsburg, California

- Wastewater in both tank T-1014A which is filled with chlorpyridines process scrubber water from tank T-90, and tank T-1014B, which is filled with chlorpyridines sump water from T-124A, chlorpyridines process scrubber water from T-124B, and 2,3-penta/chlorinolysis sump water from tank T-1111, is pumped to tank T-1010; all tanks are labeled ERM. From tank T-1010, the water continues to chlorinolysis train 2.

Chlorinolysis occurs in two trains: train 1 and train 2.

- Train 1 – The water entering train 1 passes through two reactors, R-1001 and R-1002. Bleach (sodium hypochlorite) is added to R-1001 to destroy organics. The water then continues to either tank T-1008 or tank T-1009.

- Train 2 – The water entering train 2 passes through two reactors, R-1004 and R-1003. Hydrogen peroxide is added to R-1004 to remove bleach. The water then continues to either tank T-1008 or tank T-1009.

From tanks T-1008 and T-1009, the water is sent to the process stormwater treatment plant. Additional ERM tanks collect wastewaters and feed chlorinolysis trains 1 and 2 that are not shown on the Figure 1.

Process Stormwater Treatment Plant

The process stormwater treatment plant is located in block 400 of the facility. The aqueous feed streams for this plant include water from chlorinolysis plant tanks T-1008 and T-1009 and low organic waters from sumps and rainwater. The feed streams flow to two main feed tanks, T-432 and T-493. From the feed tanks, the water continues through a heat exchanger, a counter-flow steam stripper that vents to the MS HAF, a cooler (H-405), and then to a holding tank (T-416). From the holding tank, the water flows through two carbon beds operated in series (T-417 and T-418). From the carbon beds, the water is pumped to a holding tank (T-420) and then to the brine plant.

Brine Plant

The aqueous feed streams for this plant include water from the process stormwater treatment plant, MS HAF and ST HAF scrubbers, cooling tower blowdown, and low organic waters from sumps and rainwater. The feed streams are batch-processed into three tanks, T-304, T-305, and T-306. From the tanks, the water is pumped to a clarifier (DC-1) to get rid of solids and then to the condensate plant.

Condensate Plant

From the brine plant, the water is pulled by vacuum through a triple-effect evaporator equipped with steam-jacketed heat exchangers. From the evaporator, a pure water vapor stream flows to a barometric condenser with cooling tower water to produce boiler feed water. The boiler

feed water is provided to the Calpine Los Medanos Energy Center power plant. The boiler feed water is also used in some on-site processes.

The evaporator also produces a concentrated salt stream ("finished brine") that flows to tanks T-201 and T-200 for pH adjustment. The finished brine flows through two carbon beds operated in parallel (T-202 and T-203) and then is pumped to tanks T-3070 and T-3080 for storage. Finished brine is transported to the Delta Diablo Sanitation District (DDSD) publicly owned treatment works under an industrial wastewater discharge permit (permit No. 0291135-C). DDSD uses the brine to make water more brackish before it is discharged to the brackish San Joaquin River. DDSD accepts a maximum of 10,000 gallons/day of finished brine.

ST HAF

The Symtet halogen acid furnace is located in block 660 of the facility. The ST HAF thermal reactor is a refractory-lined vertical steel vessel with a down-fired burner. A process flow diagram of the ST HAF is provided in **Figure 2**. The ST HAF thermally treats chlorinated liquid and gaseous process vent streams. The liquid stream, which includes Symtet tars and liquids, is stored in tanks T-501B and T-502A. Each tank has a maximum storage capacity of 15,000 gallons. The two tanks are heated by external heat exchangers to keep the contents liquid. The permitted gaseous process vent stream includes the following: Symtet process vent stream, DOWICIL® process vent stream, T-501B and T-502A vent streams, and MS HAF back-up vent streams. The liquid and gaseous vent streams are combusted by the burner (R-501). A liquid stream then passes through an acid absorber (B-501) that removes a 20 percent HCl product into tanks T-510A and T-510B. A gas stream from the acid absorber that includes HCl gas, nitrogen, and miscellaneous air passes to a caustic scrubber (B-502). Spent caustic water from the scrubber is stored in tank T-509 and then sent to the brine plant. A gas stream from the caustic scrubber passes through a particulate filter. When treating a liquid stream, the facility operates the nitrogen oxides (NOx) pollution control system. After passing through the particulate filter, the gas stream continues through two carbon beds operated in parallel (B-503 and B-503B) and then through the NOx and carbon reactors operated in series. The ST HAF has two stacks: the main stack is located after the NOx pollution control system, and the process stack is located before the NOx pollution control system. The process stack is used when the NOx pollution control system is bypassed when only a gaseous process vent stream is being treated.

MS HAF

The manufacturing services halogen acid furnace (MS HAF) is located in block 520 of the facility. The MS HAF thermal reactor is a refractory-lined horizontal steel vessel with two burners. A process flow diagram of the MS HAF is provided in **Figure 3**. The MS HAF thermally treats chlorinated liquid and gaseous process vent streams. At the time of the NEIC on-site inspection, Dow had discontinued treating liquid streams in the MS HAF, although it is permitted to treat a liquid stream that includes DOWICIL® waste solvent; spent solvents from facility processes;

discarded commercial products (methylene chloride, 1,3-dichloropropene, tetrachloroethylene, carbon tetrachloride, methyl chloroform, and trichloroethylene); process water organic liquid; groundwater organic liquid; MS distillation liquid; facility process drum wastes; Symtet liquid organics; carbon tetrachloride utility fluid; chlorinated hydrocarbon liquid; and tetrachloroethylene utility fluid. The permitted liquid stream storage tank is T-12, which has a maximum storage capacity of 3,750 gallons. The permitted gaseous process vent stream includes the following: distillation vent stream, HCl vent stream, 600/700 block tank and carbon tetrachloride tank truck/tank car loading vent streams, 400/520 block process vent stream, 600 block process vent stream, catacid process and HCl tank car/tank truck loading vent streams, latex process vent stream, groundwater (B-250) air stripper process vent stream, catacid process vent stream, and DOWICIL® process vent stream (ST HAF backup vent). After the burners, a liquid stream passes through an acid absorber that removes HCl product into tank T-76A. A gas stream from the acid absorber that includes HCl, nitrogen, and miscellaneous air passes through the heat exchangers. From the heat exchangers, a gas stream continues to caustic scrubbing. A liquid stream of HCl product from the heat exchangers is stored in tank T-75. Spent caustic water from the scrubbers is stored in tank T-76B. Hydrogen peroxide from tanks T-82A and T-82B is added to the spent caustic to remove bleach. The spent caustic is then sent to the brine plant. A gas stream from the caustic scrubber passes through a particulate filter and then continues to the process stack.

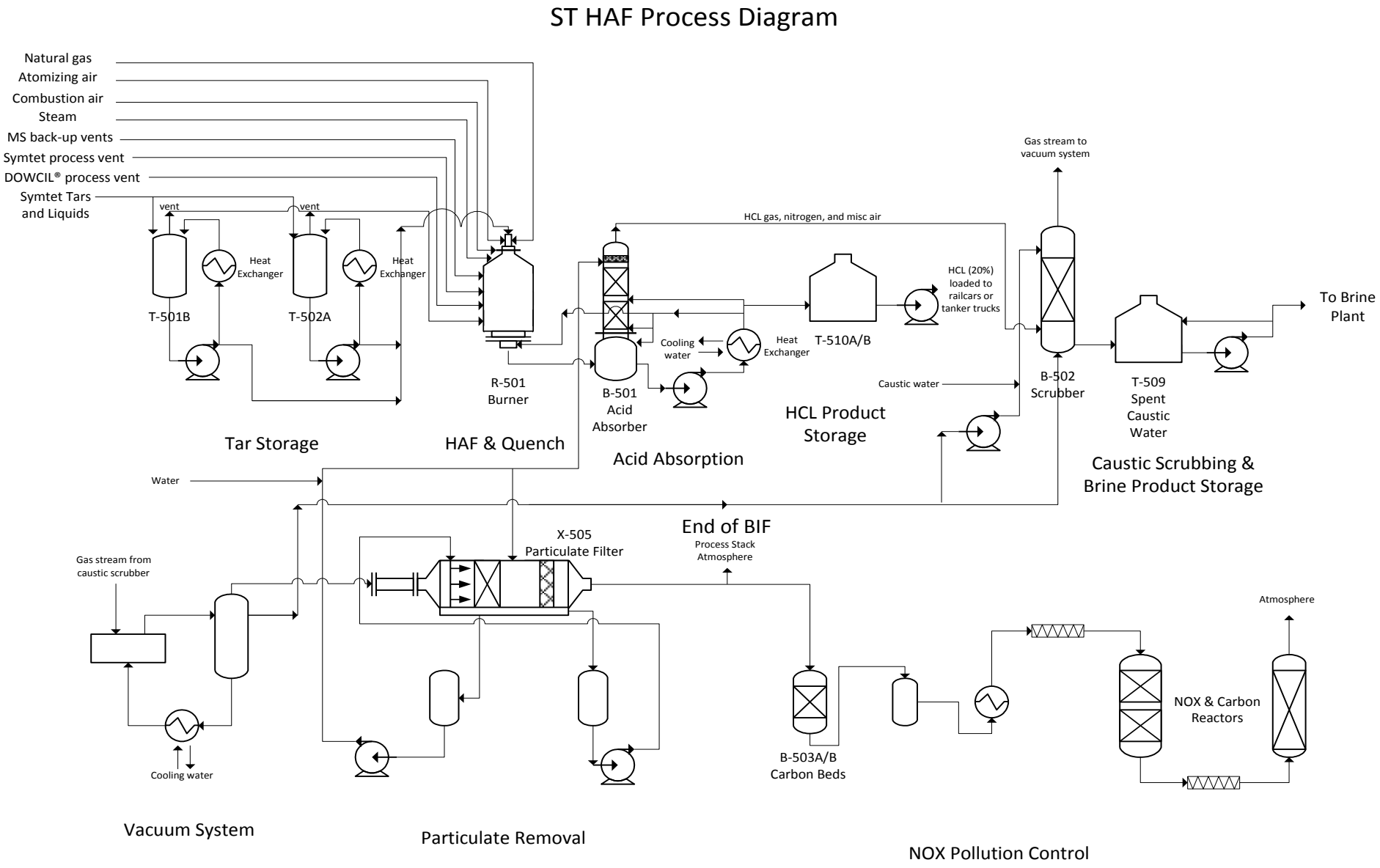

Figure 2. ST HAF process diagram
Dow Chemical
Pittsburg, California

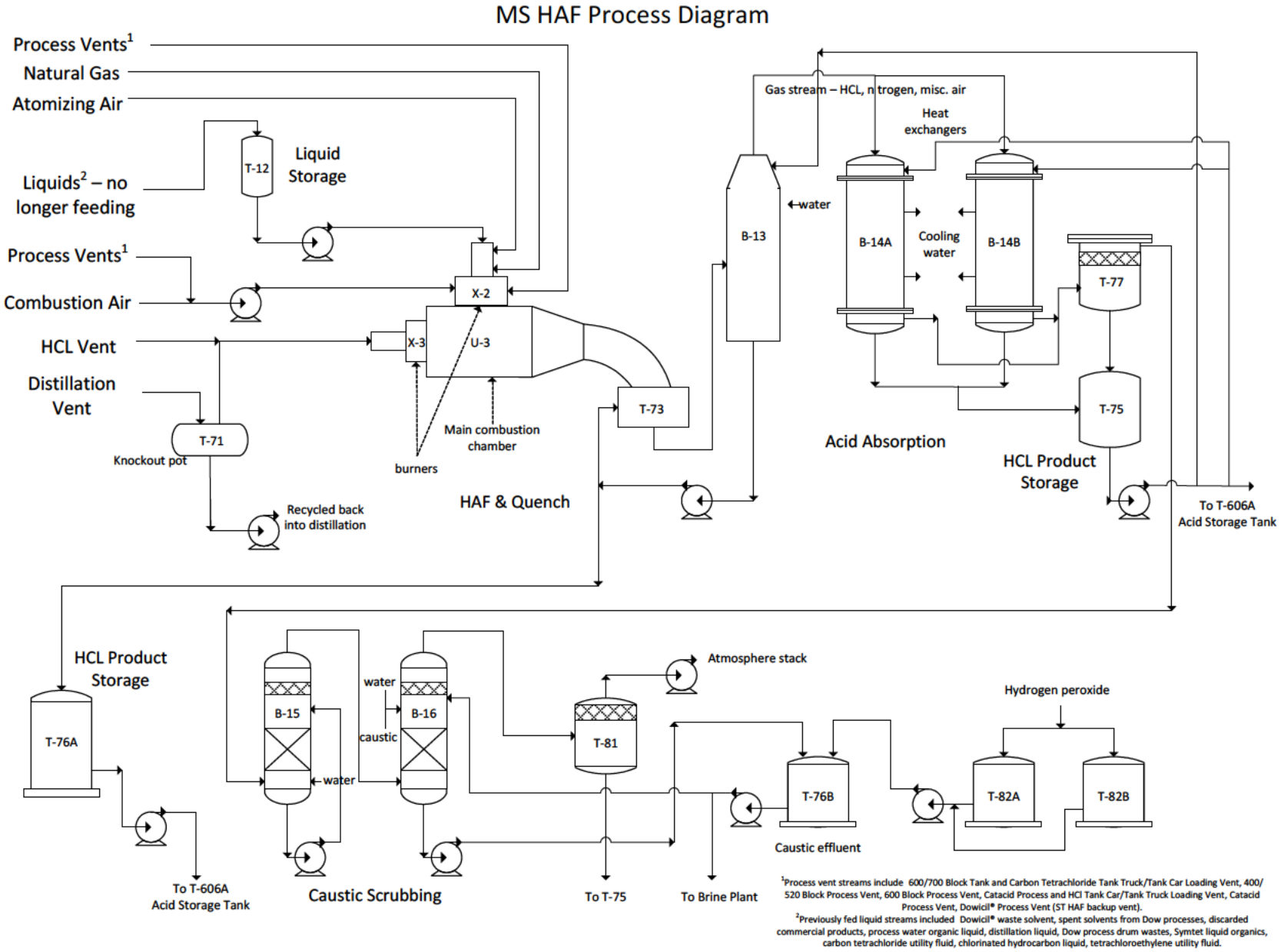

Figure 3. MS HAF process diagram
Dow Chemical
Pittsburg, California

SUMMARY OF FINDINGS

The following table summarizes the findings and observations of NEIC's on-site inspection and follow-up review of facility-provided files. Areas of noncompliance (AON) pertain to areas or issues identified by NEIC that may have potential compliance implications, but are neither inclusive nor exclusive of all such potential areas or issues. Areas of concern are inspection observations of potential problems/activities that could impact the environment, result in future noncompliance with permit or regulatory requirements, and/or are areas associated with pollution prevention issues. EPA Region 9 will assess the applicability of regulatory requirements based on its review of this report and other technical, regulatory, and facility information.

Areas of noncompliance are designated and organized by number, while areas of concern are designated and organized by letter. These are linked to specific supporting documents. Additionally, NEIC prepared documents containing photographs **(Appendix A)** and DTSC's sampling report **(Appendix B)**.

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AREAS OF NONCOMPLIANCE			
1	**22 California Code of Regulations (CCR) § 66270.1(c) Scope of the Permit Requirements –** *A permit is required for the "transfer," "treatment," "storage," and "disposal" of any waste which is hazardous waste…* **40 Code of Federal Regulations (CFR) § 270.1(c)** – *…RCRA requires a permit for the "treatment," "storage," and "disposal" of any "hazardous waste" as identified or listed in 40 CFR part 261…* **40 CFR § 261.22(a)** – *A solid waste exhibits the characteristic of corrosivity if a representative sample of the waste has either of the following properties:* ***(1)*** *It is aqueous and has a pH less than or equal to 2 or greater than or equal to 12.5...*	**Analytical data provided by Dow and results from the DTSC sampling event conducted during the NEIC inspection show wastewaters that are being managed as excluded recyclable material have a pH of greater than 12.5 and less than 2 (Appendix C and Appendices D through G). These wastewaters are RCRA hazardous wastes and are managed in tanks that do not have a RCRA permit.** Dow recovers water from on-site generated wastewaters in the chlorinolysis plant in the on-site Dow wastewater treatment system. The wastewaters, prior to treatment to recover the water for boiler feed water, are managed as ERM. ERM is a California exemption from solid and hazardous waste regulations. A letter dated January 31, 1996, from DTSC to Dow (**Appendix H)** discussing the wastewater classification states, "the Dow wastewater treatment system (DWWTS) was considered by the Department of Toxic Substances Control (DTSC) to be one continuous wastewater treatment system that reclaims from state characteristically hazardous wastewaters...steam and brine for both onsite and offsite use" and "...the influent wastewaters entering the DWWTS can be conditionally excluded from classification as a hazardous waste pursuant to HSC 25143.2(d)(1) if none of the wastes entering the DWWTS are federally-regulated." In order for wastes to meet the requirements in the January 31, 1996, letter, they cannot be RCRA hazardous wastes.	**Appendix C –** DTSC Sampling Summary **Appendix D –** 2013 to 2016 Feed to Train 1 Analysis – CBI **Appendix E –** 2013 to 2016 Feed to Train 2 Analysis – CBI **Appendix F –** 2013 to 2016 Feed to Train 1 Tank 1002 Analysis – CBI **Appendix G –** 2013 to 2016 Train 2 Tanks

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Dow believes these wastewaters are exempt because the water is being reclaimed as boiler feed water. In this case, the wastewater would remain a solid waste, and if applicable, a hazardous waste until it is reclaimed and fit for reuse. As stated in RCRA Online (RO) Memo RO 11374 (**Appendix I**), "When reused, the reclaimed rinsate would lose its status as a solid waste as provided in 40 CFR 261.2(e)(1)(ii), provided it is truly reclaimed as an effective substitute for what is typically used.... Until it is reclaimed and fit for reuse, the rinsate would remain a solid waste, and, if applicable, a hazardous waste."

Under the federal regulations, these units may be exempt from RCRA requirements under the "wastewater treatment unit exemption" (40 CFR 264.1(g)(6)), if all of the requirements of the exemption are met. However, the California DTSC regulations do not include this exemption. The tanks that contain these wastes prior to treatment, and the piping that conveys the wastes are subject to the requirements of 40 CFR § 264 Subpart J and 22 CCR §66264.190-200.

These wastewaters are generated from multiple sources and include: process stormwater, process area wash-downs, off-specification water from the DOWICIL® and LONTREL® processes, and 5 percent sulfuric acid. Additional details about the treatment process and the use of each tank are provided in "Process Overview."

During the NEIC inspection, DTSC collected samples for pH analysis. Select analytical results are provided in **Table 1** (**Appendix C)**.

Table 1		
Sample No.	Dow042016-01	Dow042016-03
Tank No.	706	1014B
pH	1	14

NEIC reviewed pH data provided by Dow for January 2013 to early April 2016 for tanks designated as containing ERM wastes that feed the chlorinolysis plant. **Table 2** summarizes when the data showed the pH of the wastes was greater than 12.5 or less than 2. Volume calculations performed by NEIC are shown in Appendices J and K, from Dow-provided data in Appendices D through G.

1014A and 1014B Analysis – CBI

Appendix H – DTSC Letter on ERM

Appendix I – RO 11374

Appendix J – Chlorinolysis Train 1 Feed Tank Analyses – CBI

Appendix K – Chlorinolysis Train 2 Feed Tank Analyses – CBI

Appendix L – ERM Qualifications – CBI

Appendix M – Inactive Waste Profiles

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Table 2

Tank No.	No. of Events	pH Ranges (≤ 2)	pH Ranges (≥ 12.5)	Volume (gallons)	Appendix
Train 1					
233	7		12.5 – 13.0	10,269	**D**
561	7	0.6 – 2.0		36,490	**D**
562	10	0.9 – 2.0	12.7 – 13.2	47,565	**D**
563	5	0.8 – 2.0		26,243	**D**
564	3	2.0	12.8 – 13.1	14,245	**D**
701	19	0.3 – 1.9		210,624	**D**
703	1	1.2		5,883	**D**
706	264	0.3 – 2.0		2,764,277	**D**
1001	317	0.3 – 2.0	12.5 – 13.5	3,108,991	**D**
Train 2					
91	3		12.5 – 13.2		**E**
124A	14		12.6 – 13.2		**E**
127	1		13.3		**E**
233	2		12.5 – 13		**E**
561	1	1.3			**E**
562	3	1.4			**E**
706	19	0.7 – 2			**E**
1001	8	1.0 – 1.4			**E**
1010	358		12.5 – 13.9		**E**
1014B	10		12.5 – 13.4		**G**
1014B	1		12.9		**E**

ERM qualifications data provided by Dow (**Appendix L)** discuss the waste classifications of multiple waste streams that are treated in the chlorinolysis plant and include pH data showing the waste streams that Dow has determined exhibit the hazardous waste characteristic of corrosivity. The ERM qualifications data state: LONTREL sump water has a "usual" pH of 1 and is corrosive by characteristic (EPA hazardous waste No. D002) (**Appendix L**, pages 35 and 36**)**; spec chem T-706 water has a pH of 1 and is corrosive by characteristic (EPA hazardous waste No. D002) (**Appendix L**, pages 40 and 42**)**; and spec chem rain

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<table>
<tr><td></td><td></td><td>water is corrosive by characteristic (EPA hazardous waste No. D002) and has a pH of less than 2 (Appendix L, page 52).

When sending tank 1014 cleaning wastes off-site, Dow has determined that some wastes have exhibited the characteristic of corrosivity. Dow provided a list of inactive waste profiles, including profiles for tank 1014 cleanings. Waste profile CH244583B (pH > 12.5) includes hazardous waste identified by EPA hazardous waste Nos. D002, D019, D039, and F002; waste profile CH199129B-DOW, 1014 tank cleaning waste (bulk), includes hazardous waste identified by EPA hazardous waste Nos. D002, D039, and F002 (Appendix M, page 1).</td><td></td></tr>
<tr><td>2</td><td>22 CCR § 66270.1(c) Scope of the Permit Requirements – A permit is required for the “transfer,” “treatment,” “storage,” and “disposal” of any waste which is hazardous waste…

40 CFR § 261.24(a) – A solid waste...exhibits the characteristic of toxicity if...the extract from a representative sample of the waste contains any of the contaminants listed in Table 1 at the concentration equal to or greater than the respective value given in that table...

<table>
<tr><th>EPA HW No.</th><th>Contaminant</th><th>Regulatory Level (mg/L)</th></tr>
<tr><td>D019</td><td>Carbon tetrachloride</td><td>0.5</td></tr>
<tr><td>D039</td><td>Tetrachloroethylene</td><td>0.7</td></tr>
</table>

40 CFR § 270.1(c) – …RCRA requires a permit for the “treatment,” “storage,” and “disposal” of any “hazardous waste” as identified or listed in 40 CFR part 261…</td><td>Results from the DTSC sampling event conducted during the NEIC inspection show wastewaters that are being managed as ERM have levels of carbon tetrachloride and tetrachloroethylene above the hazardous waste toxicity characteristic (TC) limit (Appendix C). These wastewaters are RCRA hazardous wastes (EPA hazardous waste Nos. D019 and D039) and are stored in tank 1014A, which does not have a RCRA permit.

As explained in AON 1, this waste does not meet the requirements as stated in the January 31, 1996, letter from DTSC.

During the NEIC inspection, DTSC collected and analyzed a sample from tank 1014A, labeled as ERM. Select toxicity characteristic leaching procedure (TCLP) analytical results are provided in Table 3.

<table>
<tr><th colspan="2">Table 3</th></tr>
<tr><td>Sample No.</td><td>Dow042016-02</td></tr>
<tr><td>Tank No.</td><td>1014A</td></tr>
<tr><td>Carbon tetrachloride milligrams per liter (mg/L)</td><td>2.320</td></tr>
<tr><td>Tetrachloroethene (mg/L)</td><td>0.801</td></tr>
</table>

When sending tank 1014 cleaning wastes off-site, Dow has determined that some wastes have exhibited the hazardous characteristic of toxicity for carbon tetrachloride (EPA hazardous waste No. D019) and tetrachloroethylene EPA hazardous waste No. D039). Dow provided a list of inactive waste profiles (Appendix M, page 1), including three waste profiles for tank 1014 cleanings. Waste profile CH244581B, 1014 tank cleaning (pH 7.1 – 12.4), includes wastes identified by EPA hazardous waste Nos. D019, D039, and F002; waste profile CH244583B (pH > 12.5) includes wastes identified by EPA hazardous waste Nos. D002, D019, D039, and F002; and waste profile CH199129B-DOW, 1014 tank cleaning waste (bulk), includes as wastes identified by EPA hazardous waste Nos. D002, D039, and F002. Dow also provided a list of active waste profiles</td><td>Appendix C – DTSC Sampling Summary

Appendix M – Inactive Waste Profiles

Appendix N – Active Waste Profiles</td></tr>
</table>

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		(**Appendix N,** pages 1 and 9), including waste profile CH244567B, 1014 tank cleaning (pH 2.1 – 6.9), with wastes identified by EPA hazardous waste Nos. D019, D039, and F002, and waste profile CH1077043B, 1014 solids, with wastes identified by EPA hazardous waste Nos. D019, D034, D039, and F002.	
3	**22 CCR § 66262.11 –** *A person who generates a waste, as defined in section 66261.2, shall determine if that waste is a hazardous waste...* **40 CFR § 262.11** – *A person who generates a solid waste, as defined in 40 CFR 261.2, must determine if that waste is a hazardous waste using the following method:* *(a) He should first determine if the waste is excluded from regulation under 40 CFR 261.4.* *(b) He must then determine if the waste is listed as a hazardous waste in subpart D of 40 CFR part 261.* *(c) For purposes of compliance with 40 CFR part 268, or if the waste is not listed in subpart D of 40 CFR part 261, the generator must then determine whether the waste is identified in subpart C of 40 CFR part 261 by either:* *(1) Testing the waste according to the methods set forth in subpart C of 40 CFR part 261, or according to an equivalent method approved by the Administrator under 40 CFR 260.21; or* *(2) Applying knowledge of the hazard characteristic of the waste in light of the materials or the processes used.*	**Dow has not made hazardous waste determinations for ERM wastes, specifically for TC limits on organics, and if the wastes are listed as hazardous wastes in 40 CFR Part 261 Subpart D.** Dow analyzes samples for total organic carbon (TOC) to determine volatiles, but has not analyzed for the specific volatile compounds listed in the toxicity characteristic, including carbon tetrachloride (EPA hazardous waste No. D019) and tetrachloroethylene (EPA hazardous waste No. D039). Multiple waste streams are identified in Dow's ERM qualifications data (**Appendix L**) as potentially hazardous for organic constituents, including methylene chloride and 1,3-dichloropropene, and may be listed EPA hazardous waste Nos. F002 and/or U084. ERM qualifications data provided by Dow **(Appendix L)** discuss the waste classification of multiple waste streams that are treated in the chlorinolysis plant and include: • Trifluoro scrubber water may contain tetrachloroethylene greater than 0.7 mg/L and may be toxic by characteristic (EPA hazardous waste No. D039) (**Appendix L**, page 34**)**. • DOWICIL® sump and process water may be a listed hazardous waste identified by EPA hazardous waste Nos. F002 and U084 due to methylene chloride and 1,3-dichloropropene, depending on the applicability of exclusions (**Appendix L**, page 38**).** • Spec chem T-706 water may be a listed hazardous waste identified by EPA hazardous waste Nos. F002 and U084 due to methylene chloride and 1,3 dichloropropene, depending on the applicability of exclusions (**Appendix L**, pages 41 and 42**).** • 2,3-pent slab water contains tetrachloroethylene greater than 0.7 mg/L and is toxic by characteristic (EPA hazardous waste No. D039) (**Appendix L**, page 44**).** • Symtet high TOC water contains carbon tetrachloride greater than 0.5 mg/L (EPA hazardous waste No. D019), hexachloroethane greater than 3.0 mg/L, and tetrachloroethylene greater than 0.7 mg/L (EPA hazardous waste No. D039), and may contain hexachlorobenzene greater than 0.13 mg/L (EPA hazardous waste No. D032) and hexachlorobutadiene greater than 0.5 mg/L (**Appendix L**, page 48). • Spec chem rain water may be a listed hazardous waste, as identified by EPA hazardous waste Nos. F002 and U084, due to methylene chloride and 1,3-	**Appendix L –** ERM Qualifications – CBI

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		dichloropropene, depending on the applicability of exclusions (**Appendix L**, page 52**)**.	
4	**40 CFR § 261.31(a)** – *The following solid wastes are listed hazardous wastes from non-specific sources...* ***Industry and EPA hazardous waste No.*** | ***Hazardous Waste*** *F002* | *The following spent halogenated solvents:...methylene chloride...all spent solvent mixtures/blends containing, before use, a total of then percent or more (by volume) of one or more of the above halogenated solvents...* **40 CFR § 270.1(c)** – *...RCRA requires a permit for the "treatment," "storage," and "disposal" of any "hazardous waste" as identified or listed in 40 CFR part 261…*	**Dow is accumulating methylene chloride spent solvent hazardous waste that meets the listing for EPA hazardous waste No. F002 in tank 706, which does not have a RCRA permit. Dow manages the wastewater as ERM waste.** Results from the DTSC sampling event conducted during the NEIC inspection show wastewaters that are being managed as ERM contain methylene chloride. During the NEIC inspection, DTSC collected and analyzed samples. Select analytical results are provided in **Table 4**. **Table 4** **Sample No:** | Dow042016-01 **Tank** | 706 **Methylene chloride (mg/L)** | 3.260 As explained in AON 1, this waste does not meet the requirements of the ERM exemption. ERM qualifications data provided by Dow (**Appendix L,** page 41) discuss the tank 706 waste classification as potentially hazardous waste, identified by EPA hazardous waste No. F002, spent halogenated solvent methylene chloride, and note that a *deminimus* exclusion for spent solvent might apply if the concentration is less than 25 parts per million (ppm). The exclusion requires the facility to demonstrate the concentration of the spent solvent in the wastewater does not exceed 25 ppm into the headworks of the facility's wastewater treatment system, as stated in: **40 CFR § 261.3(a)(2)(iv) –** *...the following mixtures of solid wastes and hazardous wastes listed in subpart D of this part are not hazardous wastes... if the generator can demonstrate that the mixture consists of wastewater the discharge of which is subject to regulation under either section 402 or section 307(b) of the Clean Water Act... and;* *(B) One or more of the following spent solvents listed in § 261.31-methylene chloride...Provided That the maximum total weekly usage of these solvents (other than the amounts that can be demonstrated not to be discharged to wastewater) divided by the average weekly flow of wastewater into the headworks of the facility's wastewater treatment or pretreatment system does not exceed 25 parts*	**Appendix L –** ERM Qualifications – CBI

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		per million, OR the total measured concentration of these solvents entering the headworks of the facility's wastewater treatment system ... does not exceed 25 parts per million on an average weekly basis. Facilities that choose to measure concentration levels must file a copy of their sampling and analysis plan with the Regional Administrator, or State Director... Dow did not provide information showing that the requirements of the above exclusion are met.	
5	**BIF permit V C.2** – *STHAF shall be operated at or below the compliance limits given in Table 6... Parameter: CO concentration, corrected to 7% O_2 (high range) ≤ 100 ppmv hra.* **40 CFR § 266.102(e)(1)** General. – *A boiler or industrial furnace burning hazardous waste must be operated in accordance with the operating requirements specified in the permit at all times where there is hazardous waste in the unit.*	**Based on reviewed data, the high range CO concentration (corrected to 7 percent O_2) HRA was greater than or equal to 101 parts per million by volume (ppmv) 5,691 times, while the hazardous waste feed rate HRA was greater than or equal to 1 pound per hour (lb/hr) from December 1, 2014, to February 28, 2016. Values ranged from 101.1 to 2861.9 ppmv (Appendix P).** Many data points were lost in converting the PDFs of microfiche into a text file that was then transferred to a Microsoft Excel spreadsheet so that the data could be sorted to make compliance determinations. The exceedances are based on the useable data NEIC was able to review and do not constitute a complete compliance determination for the date ranges reviewed.	**Appendix O –** Dow BIF Permit **Appendix P –** High Range CO 101 and Greater
6	**BIF permit V C.2** – *STHAF shall be operated at or below the compliance limits given in Table 6... Parameter: CO concentration, corrected to 7% O_2 (low range) ≤ 100 ppmv hra.* **40 CFR § 266.102(e)**(1) General. *A boiler or industrial furnace burning hazardous waste must be operated in accordance with the operating requirements specified in the permit at all times where there is hazardous waste in the unit.*	**Based on reviewed data, the low range CO concentration (corrected to 7% O_2) was greater than or equal to 101 ppmv 677 times, while the hazardous waste feed rate HRA was greater than or equal to 1 lb/hr from December 1, 2014, to February 28, 2016. Values ranged from 101.0 to 191.9 ppmv (Appendix Q).** Many data points were lost in converting the PDFs of microfiche into a text file that was then transferred to a Microsoft Excel spreadsheet so that the data could be sorted to make compliance determinations. The exceedances are based on the useable data NEIC was able to review and do not constitute a complete compliance determination for the date ranges reviewed.	**Appendix O –** Dow BIF Permit **Appendix Q –** Low Range CO 101 and Greater
7	**BIF permit V C.2** – *STHAF shall be operated at or below the compliance limits given in Table 6... Parameter: Minimum PM scrubber blowdown ≥ 196 lb/hr hra.* **40 CFR § 266.102(e)(1)** General. – *A boiler or industrial furnace burning hazardous waste must be operated in accordance with the operating requirements specified in the permit at all times where there is hazardous waste in the unit.*	**Based on reviewed data, the minimum PM scrubber blowdown was less than or equal to 195 lb/hr HRA one time, while the automatic waste feed cutoff valve was open and hazardous waste was flowing to the unit from December 1, 2014, to February 28, 2016. The value was 193.5 lb/hr (Appendix R).** Because Dow provided data in three separate PDF files from microfiche, there was no hazardous waste flow information on the PDF file that included this parameter, so this parameter is presented in relation to the AWFCO valve's open position. Many data points were lost in converting the PDFs of microfiche into a text file that was then transferred to a Microsoft Excel spreadsheet so that the data could	**Appendix O –** Dow BIF Permit **Appendix R –** Particulate Removal Blowdown Rate 195 and Less

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		be sorted to make compliance determinations. The exceedances are based on the useable data NEIC was able to review and do not constitute a complete compliance determination for the date ranges reviewed.	
8	**BIF permit V C.2** – *STHAF shall be operated at or below the compliance limits given in Table 6... Parameter: Minimum PM scrubber L/G ≥ 20.5 gpm/1,000 scfm hra.* **40 CFR § 266.102(e)(1)** General. – *A boiler or industrial furnace burning hazardous waste must be operated in accordance with the operating requirements specified in the permit at all times where there is hazardous waste in the unit.*	**Based on reviewed data, the minimum PM scrubber liquid/gas (L/G) ratio was less than or equal to 20 gallons per minute (gpm)/1,000 standard cubic feet per minute (scfm) HRA 44 times, while the hazardous waste feed rate HRA was greater than or equal to 1 lb/hr from December 1, 2014, to February 28, 2016. Values ranged from 0.8 to 19.9 gpm/1,000 scfm (Appendix S).** Many data points were lost in converting the PDFs of microfiche into a text file that was then transferred to a Microsoft Excel spreadsheet so that the data could be sorted to make compliance determinations. The exceedances are based on the useable data NEIC was able to review and do not constitute a complete compliance determination for the date ranges reviewed.	**Appendix O –** Dow BIF Permit **Appendix S –** LG PM Scrubber 20 and Less
9	**BIF permit V C.2** – *STHAF shall be operated at or below the compliance limits given in Table 6... Parameter: Minimum combustion temperature ≥ 1021 ℃ instantaneous.* **40 CFR § 266.102(e)(1)** General. – *A boiler or industrial furnace burning hazardous waste must be operated in accordance with the operating requirements specified in the permit at all times where there is hazardous waste in the unit.*	**NEIC reviewed the minimum combustion temperature instantaneous data provided by Dow for the period March 23, 2016, to April 6, 2016. The minimum combustion temperature was less than 1,020 degrees Celsius (°C) based on instantaneous data 45 times, while the hazardous waste feed rate HRA was greater than or equal to 1 lb/hr. Values ranged from 930.3 to 1,019.2 °C (Appendix T).**	**Appendix O –** Dow BIF Permit **Appendix T –** NEIC-Calculated Hourly Rolling Averages
10	**BIF permit V C.2** – *STHAF shall be operated at or below the compliance limits given in Table 6... Parameter: Minimum PM scrubber blowdown ≥ 196 lb/hr hra.* **40 CFR § 266.102(e)(1)** General. – *A boiler or industrial furnace burning hazardous waste must be operated in accordance with the operating requirements specified in the permit at all times where there is hazardous waste in the unit.*	**NEIC performed hourly rolling average calculations on PM scrubber blowdown minute data provided by Dow for the period March 25, 2016, to April 8, 2016. The PM scrubber blowdown was less than 195 lb/hr HRA 29 times, while the hazardous waste feed rate HRA was greater than or equal to 1 lb/hr. Values ranged from 69.2 to 188.6 lb/hr (Appendix T).** While this AON is based on the same permit citation as AON 8, the data evaluated was for different timeframes and for this AON, NEIC performed calculations on minute data provided by Dow. Minute data was not available for dates before March 25, 2016, because Dow only keeps minute data for approximately 2 weeks.	**Appendix O –** Dow BIF Permit **Appendix T –** NEIC Calculated Hourly Rolling Averages
11	**BIF permit V C.2** – *STHAF shall be operated at or below the compliance limits given in Table 6... Parameter: Maximum stack gas flow rate ≤ 511 scfm hra.*	**NEIC performed hourly rolling average calculations on stack gas flow rate minute data provided by Dow for the period March 25, 2016, to April 8, 2016. The stack gas flow rate was greater than or equal to 512 scfm HRA 6 times, while the hazardous waste feed rate HRA was greater than or equal to 1 lb/hr. Values ranged from 512.1 to 512.7 scfm (Appendix T).**	**Appendix O –** Dow BIF Permit **Appendix T –** NEIC-Calculated

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	40 CFR § 266.102(e)(1) General. – *A boiler or industrial furnace burning hazardous waste must be operated in accordance with the operating requirements specified in the permit at all times where there is hazardous waste in the unit.*		Hourly Rolling Averages
12	**BIF permit V C.2** – *STHAF shall be operated at or below the compliance limits given in Table 6... Parameter: CO concentration, corrected to 7% O_2 (low range) ≤ 100 ppmv hra.* **40 CFR § 266.102(e)**(1) General. – *A boiler or industrial furnace burning hazardous waste must be operated in accordance with the operating requirements specified in the permit at all times where there is hazardous waste in the unit.*	**NEIC performed hourly rolling average calculations on the low range CO concentration minute data provided by Dow for the period March 25, 2016, to April 8, 2016. The low range CO concentration was greater than or equal to 101 ppmv HRA 44 times, while the hazardous waste feed rate HRA was greater than or equal to 1 lb/hr. Values ranged from 101.1 to 126.1 ppmv (Appendix T).** While this AON is based on the same permit citation as AON 7, the data evaluated was for different timeframes and for this AON, NEIC performed calculations on minute data provided by Dow. Minute data was not available for dates before March 25, 2016, because Dow only keeps minute data for approximately 2 weeks.	**Appendix O –** Dow BIF Permit **Appendix T –** NEIC-Calculated Hourly Rolling Averages
13	**BIF permit V C.2** – *STHAF shall be operated at or below the compliance limits given in Table 6... Parameter: CO concentration, corrected to 7% O_2 (high range) ≤ 100 ppmv hra.* **40 CFR § 266.102(e)(1)** General. – *A boiler or industrial furnace burning hazardous waste must be operated in accordance with the operating requirements specified in the permit at all times where there is hazardous waste in the unit.*	**NEIC performed hourly rolling average calculations on high range CO concentration minute data provided by Dow for the period March 25, 2016, to April 8, 2016. The high range CO was greater than 101 ppmv HRA 269 times, while the hazardous waste feed rate HRA was greater than or equal to 1 lb/hr. Values ranged from 103.3 to 1,798.3 ppmv (Appendix T).** While this AON is based on the same permit citation as AON 6, the data evaluated was for different timeframes and for this AON, NEIC performed calculations on minute data provided by Dow. Minute data was not available for dates before March 25, 2016, because Dow only keeps minute data for approximately 2 weeks.	**Appendix O –** Dow BIF Permit **Appendix T –** NEIC-Calculated Hourly Rolling Averages
AREAS OF CONCERN			
A	**40 CFR § 266.102(e)(10)** Recordkeeping. – *The owner or operator must maintain in the operating record of the facility all information and data required by this section for five years.*	**Dow does not keep monitoring records from the HAFs, required by the BIF permit, in a way that facilitates regulatory agency review.** Dow only keeps records of the HRAs, saved as PDFs from microfiche, based on calculations performed in Fortran. Microfiche and Fortran are antiquated technologies and do not allow for the sorting of data to easily determine if permit limits are being met. Keeping records this way inhibits regulatory agencies from determining compliance. Records should be kept using current recordkeeping technologies (Microsoft Excel, Microsoft Access, etc.) to facilitate regulatory agency review. It may be necessary to add a requirement to Dow's permit that specifies recordkeeping data	

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		must be recorded, and calculated, in a format/program/computer language that enforcement officers can reasonably be expected to review and sort.	
B	**BIF permit V C.2** – *STHAF shall be operated at or below the compliance limits given in Table 6... Parameter: Maximum total stack gas flow rate ≤ 511 scfm hra.* **40 CFR § 266.102(e)(1)** General. – *A boiler or industrial furnace burning hazardous waste must be operated in accordance with the operating requirements specified in the permit at all times where there is hazardous waste in the unit.*	**Based on reviewed data, the stack gas flow rate was greater than or equal to 512 scfm HRA 9,305 times from December 1, 2014, to February 28, 2016. Values ranged from 512.0 to 798.3 scfm (Appendix U).** Because Dow provided data in three separate PDF files from microfiche, there was no hazardous waste flow information in the PDF file that included this parameter. And given that many data points were lost in converting the PDFs of microfiche into a text file that was then transferred to a Microsoft Excel spreadsheet so the data could be sorted to make compliance determinations, accurately combining the three PDFs of recordkeeping data would have been extremely resource intensive and therefore was not done. As a result, the exceedances are based on the useable data NEIC was able to review and do not constitute a complete compliance determination for the date ranges reviewed.	**Appendix O –** Dow BIF Permit **Appendix U** – Stack Gas Flow Rate 512 and Greater
C	**BIF permit V C.2** – *STHAF shall be operated at or below the compliance limits given in Table 6... Parameter: Atomizing air pressure ≥ 51.5 psig hra.* **40 CFR § 266.102(e)(1)** General. – *A boiler or industrial furnace burning hazardous waste must be operated in accordance with the operating requirements specified in the permit at all times where there is hazardous waste in the unit.*	**Based on reviewed data, the atomizing air pressure was less than or equal to 51 pounds per square inch gauge (psig), based on an HRA, 28,086 times from December 1, 2014, to February 28, 2016. Values ranged from 0 to 51 psig (Appendix V).** Because Dow provided data in three separate PDF files from microfiche, there was no hazardous waste flow information in the PDF file that included this parameter. And given that many data points were lost in converting the PDFs of microfiche into a text file that was then transferred to a Microsoft Excel spreadsheet so that the data could be sorted to make compliance determinations, accurately combining the three PDFs of recordkeeping data would have been extremely resource intensive and therefore was not done. As a result, the exceedances are based on the useable data NEIC was able to review and do not constitute a complete compliance determination for the date ranges reviewed.	**Appendix O –** Dow BIF Permit **Appendix V** – Atomizing Air Pressure 51 and Less
D	**Boiler and Industrial Furnace (BIF) permit V B.2** – *STHAF shall be operated at or below the compliance limits given in Table 6... Parameter: Maximum total Cl feed rate ≤ 749 lb/hr hra.* **40 CFR § 266.102(e)(8)(i) –** *The owner or operator must monitor and record the following, at a minimum, while burning hazardous waste: (A) If specified by the permit, feed rates and composition of hazardous waste, other fuels, and industrial furnace feedstocks, and feed rates of ash, metals, and total chloride and chlorine;*	**Dow's calculation of total chloride feed rate to the ST HAF can include negative values and cause the recorded value to be incorrect (Appendix W).** A flowmeter measures the feed rate of each chloride containing feed stream. The measured feed rate and a value determined to be the concentration of chloride in each feed stream (assumes saturation) are used to determine the chloride feed from each feed stream. The values for each feed stream are then added together and that sum is reported as the total chloride feed rate. Background calculations, performed in Fortran, show that if a feed stream valve is closed, and the flow is zero, it is possible that the flowmeter will report a negative value for flow. When a negative for flow is reported, that negative value is multiplied by the concentration of chloride in that feed stream and added to the other feed streams chloride contributions. A negative value for chloride	**Appendix W -** ST HAF BIF Calculations

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		feed is not possible. When a negative value is included in this addition, it is lowering the recorded total chloride feed rate. Chlorinated organic waste liquids are treated at the ST HAF, and the chlorides in the waste feeds are recovered as hydrochloric acid product. Some process vent streams are also thermally treated at the ST HAF. The normal waste liquid feed is chlorinated pyridines, which contain about 15 percent by weight ferric chloride catalyst, from adjacent plants.	
E		**HRAs of continuous monitoring data include negative numbers for multiple parameters. Monitoring equipment that is reporting negative numbers may be malfunction that should trigger the AWFCO system (Appendix X).** Hourly rolling average data was reviewed from December 1, 2014, to February 28, 2016. The negative values are based on the useable data NEIC was able to review and do not constitute a complete compliance determination for the date ranges reviewed. The hazardous waste feed rate HRA was reported as a negative value 795 times. Values ranged from -9.15 to -0.03 lb/hr. The L/G PM Scrubber HRA was reported as a negative value 61 times, while the hazardous waste feed rate HRA was greater than or equal to 1. Values ranged from -95.27 to -3.05 gpm/1,000 scfm. The atomizing air pressure HRA was reported as a negative value 8,082 times. Values ranged from -0.55 to -0.01 psig. The stack gas flow rate HRA was reported as a negative value 15,887 times. Values ranged from -2.93 to -0.15 scfm.	**Appendix X –** Negative HRAs